

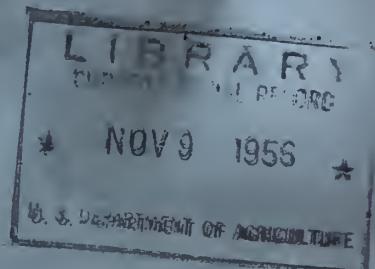
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Federal - State Cooperative
Snow Surveys and Water Supply Forecasts
for

Rio Grande Drainage Basin



Soil Conservation Service
UNITED STATES DEPARTMENT OF AGRICULTURE
AND
COLORADO AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, National Park Service, State Engineers of Colorado and New Mexico and other Federal, State and local organizations.

AS OF
MAR. 1, 1954

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY
AND WATER SUPPLY FORECAST REPORTS:

Forecasts by U. S. Weather Bureau of total annual streamflow October-September, inclusive, at more than 300 gaging stations are issued monthly January through May in the publication WATER SUPPLY FORECASTS FOR THE WESTERN UNITED STATES.

Weather Bureau forecasts of runoff presented in that bulletin are computed from procedures based on mathematical analysis of the relation between precipitation and runoff.

The Weather Bureau bulletins may be secured by writing to:

Hydrologist in Charge
River Forecast Center
U. S. Weather Bureau
712 Federal Office Building
Kansas City 6, Missouri

For current information on local river and flood conditions, reference should be made to the appropriate River District Office listed below:

Meteorologist in Charge.....	Pecos River in N. Mex.;
Weather Bureau Airport Station	Rio Grande and tributaries
Albuquerque, N. Mex.	at and above Elephant Butte Dam, N. Mex.

Rio Grande

FEDERAL-STATE COOPERATIVE
SNOW SURVEY AND WATER SUPPLY
FORECASTS

FOR
RIO GRANDE

Report Prepared
by
Homer J. Stockwell, Snow Survey Leader
and
Jack N. Washichek, Assistant Snow Survey Leader

Soil Conservation Service
Colorado Experiment Station
Fort Collins, Colorado

General Series Paper No. 569
Colorado Agricultural Experiment Station

1. $\mathcal{L}_1(\mathbb{R}^n; \mathbb{R}^m) \cong \mathcal{L}^1(\mathbb{R}^n, \mathbb{R}^m)$

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WATER SUPPLY OUTLOOK
RIO GRANDE AND CANADIAN DRAINAGE BASINS
MARCH 1, 1954

The water supply outlook for the Rio Grande in Colorado and New Mexico is far below normal stream flow during the 1954 season. Snow accumulation to March 1 is about 65 percent of normal at higher elevations and much less at lower elevations. The most probable summer flow of the Rio Grande is about 65 percent of normal in San Luis Valley and less in percent of normal in New Mexico. Soil moisture conditions are fair in San Luis Valley and poor along the Rio Grande in New Mexico.

Snow accumulation of the Rio Grande and its tributaries in the San Luis Valley is about 65 percent of normal to March 1, 1954. The increase during February was much less than average on both the Continental Divide and Sangre de Cristo Ranges. Summer flow of the Rio Grande and its tributaries in the San Luis Valley is expected to be about as indicated from current snow cover. Soil moisture conditions in the valley are reported as fair to poor. Storage in irrigation reservoirs is much less than normal and a year ago. The water supply outlook is relatively poor for this area but slightly better than for 1950 and 1951.

The water supply outlook for the Rio Grande in New Mexico is critically poor. Snow water content on a number of snow courses declined during February which has rarely occurred during the past record of snow observations. Net snow water in the mountains of northern New Mexico is less than for February 1. Therefore the expected summer flow of the Rio Grande and Rio Chama in New Mexico has declined sharply since February 1. El Vado reservoir is practically empty and peak flow storage will be limited. Stream flow is below average and soils at both mountain and valley elevations are extremely dry.

Storage in Elephant Butte and Caballo reservoirs totals 185,000 acre-feet as compared to 467,000 on March 1, 1953. The expected inflow to Elephant Butte has dropped since February 1. The most probable inflow for the summer months will most probably be from 30-40 percent of the 1942-1951 period, less than the winter season flow. This ten year average is much less than for the long term record of stream flow. Soils in the irrigated areas along the Rio Grande in southern New Mexico and western Texas are extremely dry. Snow cover on the headwaters of the Pecos river is very low. However, snow melt on this stream affects stream flow only a short distance from the mountains. Soil moisture conditions are poor on the Carlsbad project.

On Canadian River tributaries snow cover has declined substantially during February and is now about 60 percent of normal. Soil moisture conditions on the Tucumcari irrigated area are reported as poor. Stream flow is below average. Storage in Conchas reservoir is now 69,000 acre feet as compared to 75,600 a year ago and 320,000 acre feet as average.

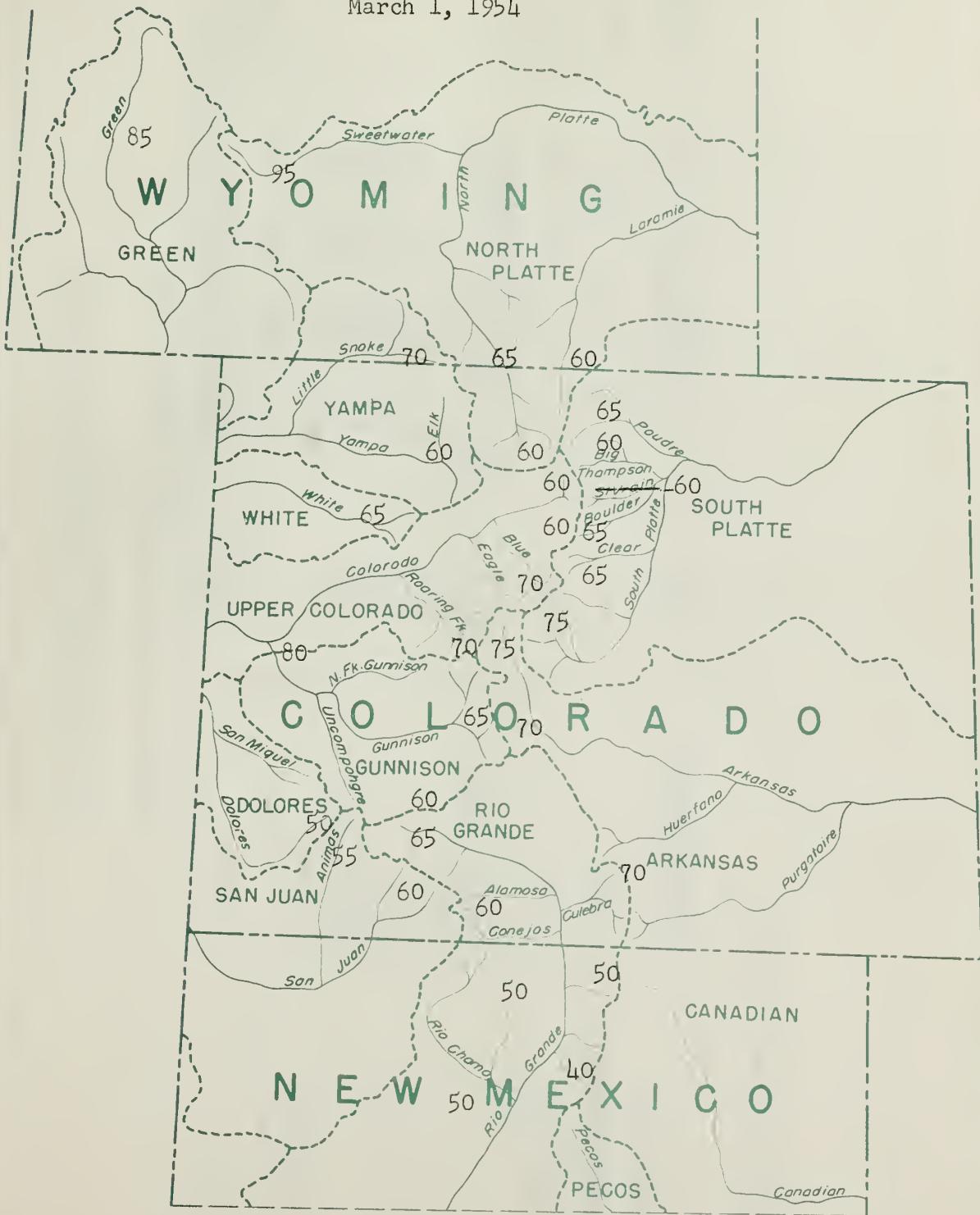
1. 1970-1971 學年
2. 1971-1972 學年
3. 1972-1973 學年
4. 1973-1974 學年
5. 1974-1975 學年

But also, as we have seen, the best students who can afford it
have been given a better education than most of us get, and
the best government, and the best opportunities for self-education,
and the best opportunities for making the best use of what they
have learned. This is a fact in which we must take an
interest, and the rest of us must do our best to help to make
it a fact. We must not let our children be beaten out of the race
by the children of other countries, and we must do all we can
to give our children every opportunity to succeed.

WATER CONTENT OF SNOW ON THE WATERSHEDS OF
PLATTE, ARKANSAS, UPPER COLORADO AND RIO GRANDE BASINS
BASED ON SNOW SURVEYS MADE APPROXIMATELY FIRST DAY OF MONTH

In Percent of Normal

March 1, 1954

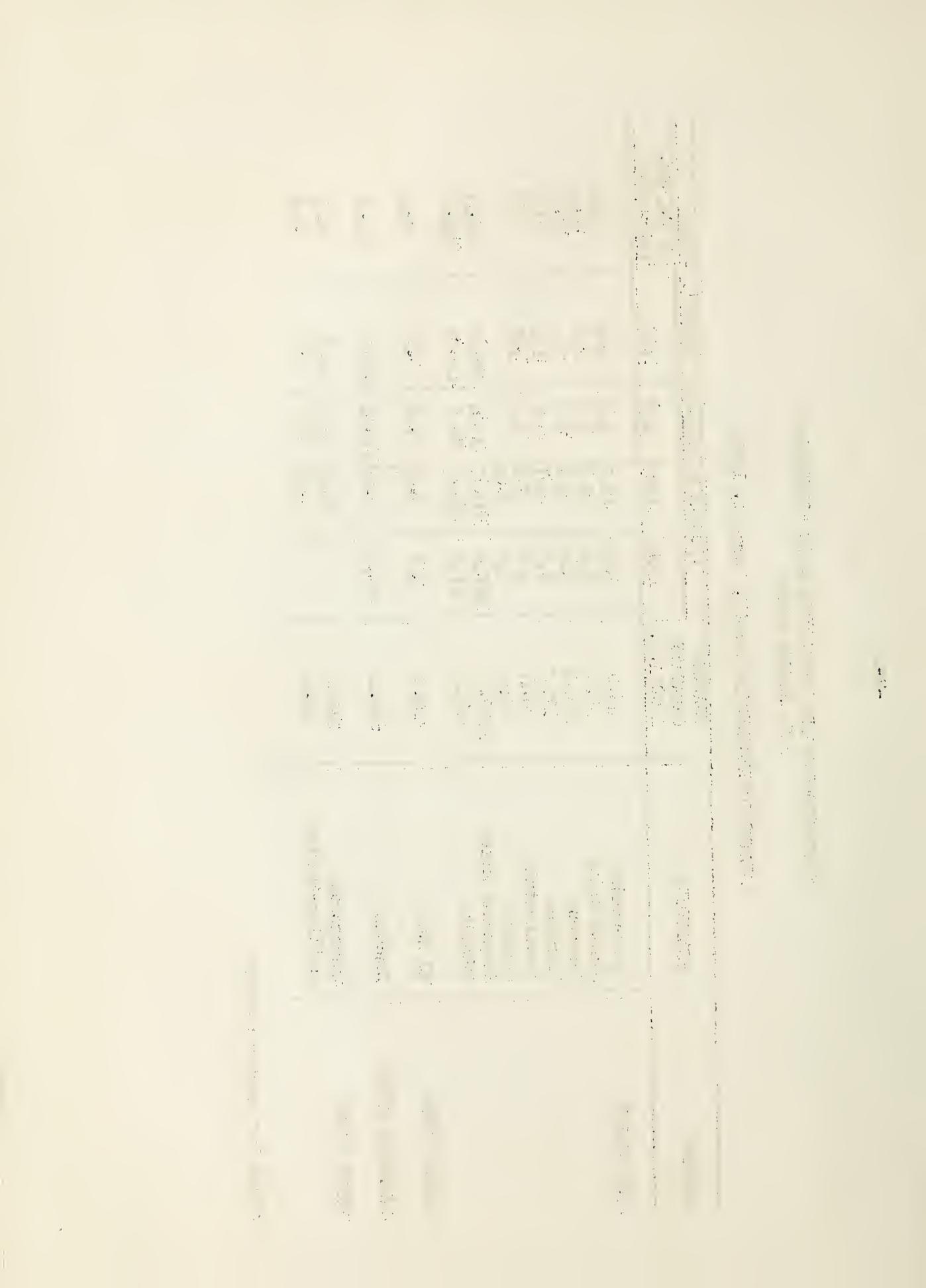


**SNOW SURVEYS AND IRRIGATION WATER FORECASTS
RIO GRANDE BASIN**

STATUS OF RESERVOIR STORAGE; March 1, 1954

STREAM	RESERVOIR	USABLE CAPACITY 1000 A.F.	1,000 A.F. Storage, March 1, 1954				10 yr. Avg. 1942-1951
			1954	1953	1952	1951	
RIO GRANDE	Rio Grande	45.0	5.9	16.5	5.5	4.2	16.9
	Santa Maria	45.0	2.4	9.7	2.8	2.6	11.4
	Sanchez	103.0	3.6	5.4	3.5	3.4	13.7
	Terrace	17.7	1.5	4.7	2.2	1.4	3.6
	Continental	26.7	4.9	5.6	3.0	3.8	9.8
	Platoro	60.0	0.0	0.0	0.0	0.0	952.1
	Elephant Butte	2273.7	167.6	312.7	17.4	298.8	254.0
	Caballo	365.0	17.6	154.1	86.5	160.3	
	El Vado	226.0	3.7	8.0	1.0	5.0	62.1
	Conchas	600.0	69.0	75.6	216.4	293.7	344.6
CHAMA RIVER	Alamogordo	148.0	39.0	31.5	10.8	7.6	70.0
	McMillan-Avalon	45.0	4.0	4.7			13.5
CANADIAN RIVER							
PECOS RIVER							

*Some for shorter periods



SNOW SURVEYS AND IRRIGATION WATER FORECASTS
for
RIO GRANDE BASIN
March 1, 1954

SUMMARY OF MARCH 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY
WATERSHEDS

WATERSHEDS	Snow Depth 1954 Inches	Snow Water Content in Inches				No. of Courses in Average	Snow Density 1954 Percent	1954 Water Content in percent of 18 yr. Avg.*
		1954	1953	1952	18 yr. Avg.			
Rio Grande (Colo.)	22.6	6.1	5.4	--	10.6	16	27	113
Upper Rio Grande	29.1	7.1	6.6	--	10.7	3	24	58
Alamosa River	25.2	7.1	6.6	--	10.7	2	28	66
Conejos River	26.4	7.3	10.2	--	15.3	5	28	66
Culebra River	27.5	6.5	6.3	22.2	9.5	1	24	48
Rio Grande (N.M.)	13.3	3.3	--	10.4	6.7	14	25	68
Chama River	19.6	4.9	8.0	18.2	10.9	5	25	49
Pecos River	3.7	0.8	5.6	7.8	4.6	3	25	45
Canadian River	16.4	4.0	--	10.4	6.9	3	24	17
*Some for shorter periods								

P R E C I P I T A T I O N D A T A

WATERSHED	STATE	Precipitation October 1 to February 28		Departure from normal	Precipitation February	Departure from Normal
		Inches	Inches			
Canadian	New Mexico	3.82	-0.01	Inches	0.24	Inches
Rio Grande	Colorado	2.71	+0.04		0.06	-0.38
Rio Grande (N)	New Mexico	4.90	-0.91		0.24	-0.37
Rio Grande (S)	New Mexico	1.07	-1.50		0.01	-1.03
Pecos	New Mexico	1.53	-1.64		0.00	-0.33
						-0.53

*Average of Selected High Elevation Stations

RIO GRANDE DRAINAGE SNOW SURVEYS
March 1, 1954

Drainage Basin and Snow Course	No. and state	Elev.	Snow Cover Measurements						Years of Record	
			1954			Past Record				
			Date of Survey	Snow Depth (In.)	Water Content (In.)	1953	1952	Average		
RIO GRANDE IN COLORADO										
Wolf Creek Pass	26	Colo.	10000	2/25	52.9	17.2	15.3	16.3	24.5	17
Upper Rio Grande	27	"	9350	3/1	24.5	4.5	--	11.7	6.8	16
Silver Lakes	47	"	9600	2/27	10.3	2.2	3.3	14.0	5.6	17
River Springs	49	"	9300	3/1	14.1	3.3	4.6	19.0	7.3	17
La Veta Pass #2	74	"	9300	3/1	19.1	6.1	8.8	18.0	7.8	16
Summitville	76	"	11500	3/1	35.9	9.1	9.9	--	15.7	13
Cumbres Pass #2(a)	77	"	10000	3/1	22.0	7.1	13.0	30.3	19.6	17
Santa Maria	80	"	9700	3/1	9.8	2.8	3.4	8.2	4.4	15
Culebra	82	"	10000	3/1	27.5	6.5	6.3	22.2	9.5	14
Ft. Garland	84	"	8200	2/28	0.0	0.0	--	4.3	2.9	12
Platoro	108	"	9950	3/1	31.8	8.2	12.5	--	15.2	4
West Conejos	109	"	9450	3/3	20.6	5.2	7.2	20.9	11.3	5
La Manga	110	"	10100	3/1	43.7	12.6	13.6	42.3	23.0	5
Pyramid	122	"	10300	2/26	25.5	6.1	6.2	15.0	3	
Spr. Creek Pass	123	"	10900	2/28	24.3	6.0	4.7	13.8	3	
Pool Table Mt.	124	"	10000	2/26	17.2	3.5	3.4	8.3	5.2	5
Lake Humphreys	125	"	9300	3/1	18.9	4.8	5.1	10.3	6.5	5
Cochetopa Pass	126	"	10000	3/1	13.5	3.8	3.5	5.5	4.6	5
Howardville	151	"	9800	3/1	26.5	7.6	7.5	14.7	3	
Red Mt. Pass	153	"	11000	3/1	63.9	20.1	18.6	40.0	3	
Porcupine	154	"	10400	2/28	34.1	8.5	5.9	15.9	3	
Wolf Creek Summit	155	"	11000	2/28	50.7	15.9	13.9	42.2	3	
Average for drainage					22.6	6.1	7.9	16.5	10.6	
UPPER RIO GRANDE										
Wolf Creek Pass	26	"	10000	2/28	52.9	17.2	15.3	46.3	24.5	17
Upper Rio Grande	27	"	9350	3/1	24.5	4.5	--	11.7	6.8	16
Santa Maria	80	"	9700	3/1	9.8	2.8	3.4	8.2	4.4	15
Average for drainage					29.1	8.1	9.4	22.1	11.9	
ALAMOSA RIVER										
Silver Lakes	47	Colo.	9600	2/27	10.3	2.2	3.3	14.0	5.6	17
Summitville	76	"	11500	3/1	35.9	9.1	9.9	--	15.7	13
Average for drainage					25.2	7.1	6.6	--	10.7	
CONEJOS RIVER										
River Springs	49	Colo.	9300	3/1	14.1	3.3	4.6	19.0	7.3	17
Cumbres Pass #2(a)	77	"	10000	3/1	22.0	7.1	13.0	10.3	19.6	17
Platoro	108	"	9950	3/1	31.8	8.2	12.5	--	15.2	4
West Conejos	109	"	9450	3/3	20.6	5.2	7.2	20.9	11.3	5
La Manga	110	"	10100	3/3	43.7	12.6	13.6	42.8	23.0	5
Average for drainage					26.4	7.3	10.2	--	15.3	
CULEBRA RIVER										
Culebra	82	Colo.	10000	3/1	27.5	6.5	6.3	22.2	9.5	14

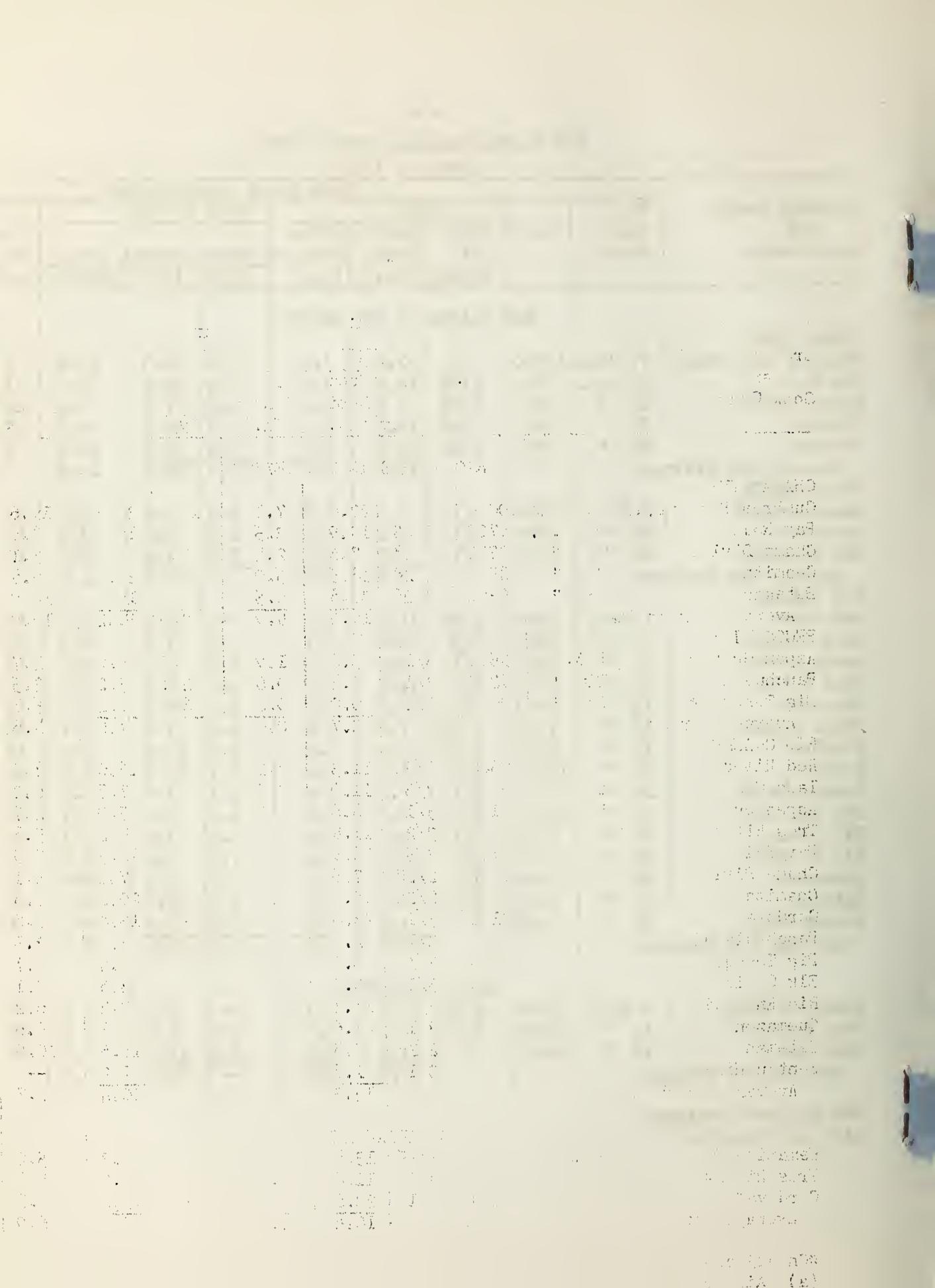
(a) Air Observed

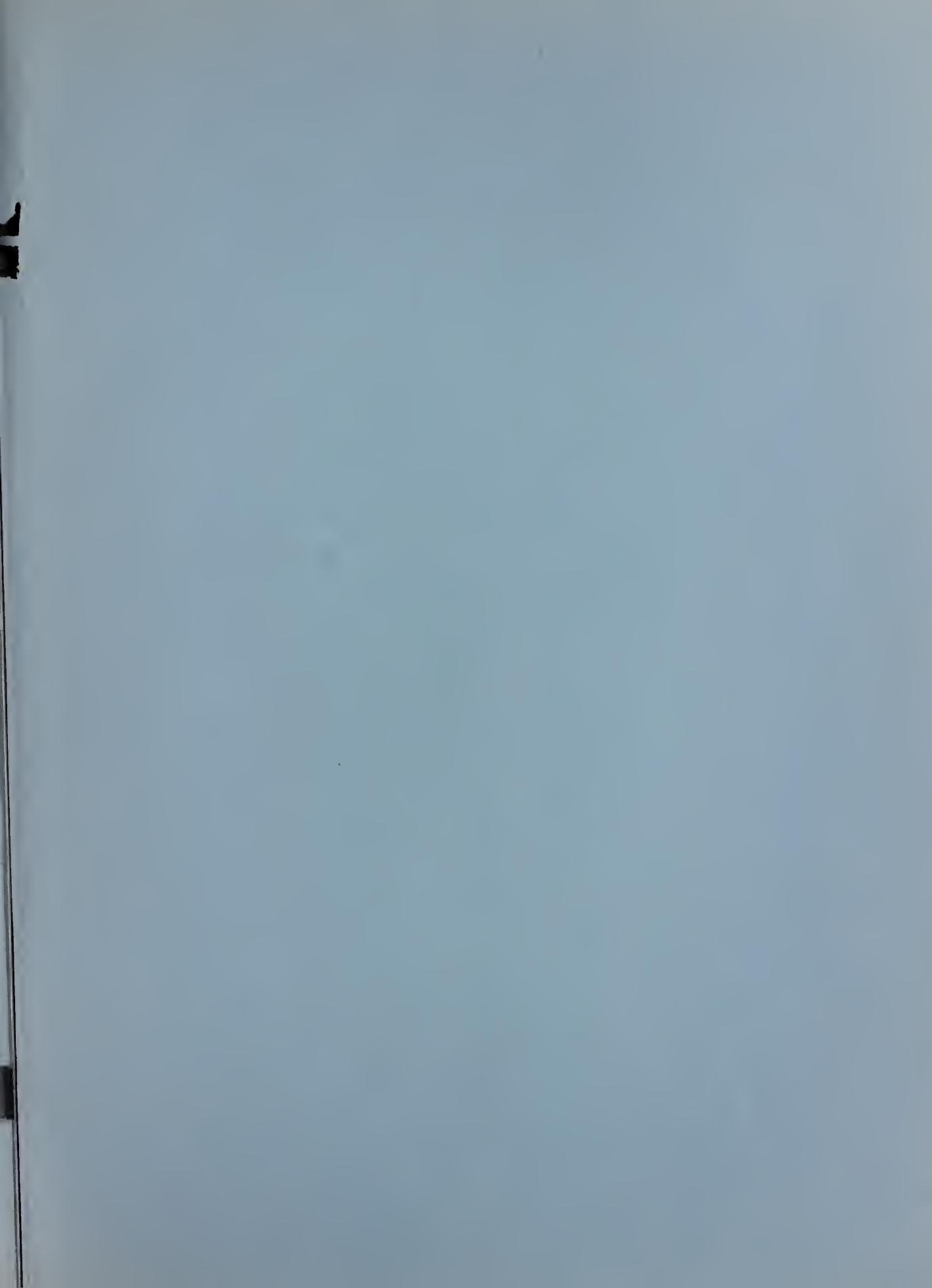
RIO GRANDE DRAINAGE SNOW SURVEYS
March 1, 1954

Drainage Basin and Snow Course	No. and State	Elev.	Snow Cover Measurements						Years of Record			
			1954			Past Record						
			Date of Survey	Snow Depth (In.)	Water Content (In.)	1953	1952	Average				
RIO GRANDE IN NEW MEXICO												
CHAMA RIVER												
Cumbres Pass #2(a)	77 Colo.	10000	3/1	22.0	7.1	13.0	30.3	19.6	17			
Pay Role	15 N.M.	9700	2/25	18.9	3.5	5.4	16.3	8.9	13			
Chama Divide	17 "	7750	2/28	7.6	2.4	4.6	7.4	5.1	14			
Chamita	18 "	8500	2/28	18.5	5.0	7.5	20.2	9.8	13			
Bateman	29 "	9300	2/26	30.8	6.5	9.4	16.6	10.9	4			
Average for drainage				19.6	4.9	8.0	18.2	10.9				
PECOS RIVER												
Aspen Grove*	4 N.M.	9500	3/1	5.6	1.9	6.5	5.0	4.7	17			
Panchuela	20 "	9200	3/1	2.4	0.6	4.1	3.2	3.5	17			
Big Tesuque*	21 "	9000	3/1	0.0	0.0	6.3	7.4	5.7	12			
Average for drainage				3.7	0.8	5.6	7.8	4.6				
RIO GRANDE												
Red River	1 N.M.	9500	2/26	11.3	3.4	--	16.0	8.0	16			
Taos Canyon	2 "	9000	3/3	11.0	3.7	4.9	7.7	6.2	16			
Aspen Grove	4 "	9100	3/1	8.6	1.9	6.5	5.0	4.7	17			
Tres Ritos	12 "	9000	3/2	11.8	3.3	--	8.2	5.8	16			
Pay Role	15 "	9700	2/25	18.9	3.9	5.4	16.3	8.9	13			
Chama Divide	17 "	7750	2/28	7.6	2.4	4.6	7.4	5.1	14			
Chamita	18 "	8500	2/28	18.5	5.0	7.5	20.2	9.8	13			
Cordova	19 "	10100	3/1	23.6	5.1	9.1	15.8	9.8	12			
Pancheula #2	20 "	8300	3/1	2.4	0.6	4.1	3.2	3.5	17			
Big Tesuque	21 "	10000	3/1	0.0	0.0	6.5	7.4	5.7	12			
Elk Cabin	24 "	8350	3/1	0.0	0.0	3.3	3.6	3.1	6			
Rio En Medio	26 "	10400	3/1	18.1	5.2	7.1	9.4	6.2	4			
Quemazon	28 "	9500	3/1	23.6	5.0	7.2	9.1	6.6	4			
Batemann	29 "	9300	2/26	30.8	6.5	9.4	16.6	10.9	4			
Fenton Hill	31 "	8900	3/1	1.6	0.9	5.0	7.2	--	2			
Average for drainage				13.3	3.3	5.4	10.4	6.7				
CANADIAN RIVER												
Hematite Park	9 N.M.	9500	2/25	13.8	3.7	--	7.3	5.2	16			
Tres Ritos*	12 "	9000	3/2	11.8	3.3	3.9	8.2	5.8	16			
Cordova*	19 "	10100	3/1	23.6	5.1	9.1	15.8	9.8	12			
Average for drainage				16.4	4.0	--	10.4	6.9				

*On adjacent drainage

(a) Air Observed





Federal - State - Private

COOPERATIVE SNOW SURVEYS

—
Furnishes the basic data
necessary for forecasting
water supply for irrigation,
domestic and municipal water
supply, hydro-electric power
generation, navigation,
mining and industry

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"WATER IS THE WEST'S GREATEST RESOURCE"